DRAFT
SAMPLING AND ANALYSIS PLAN
FOR
COLUMBIA FALLS ALUMINUM COMPANY
ALUMINUM SMELTER FACILITY
COLUMBIA FALLS, FLATHEAD COUNTY, MONTANA

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8

Prepared by
WESTON SOLUTIONS, INC.
Region 8 Superfund Technical Assessment and Response Team

August 2013

For approval signatures, see Worksheet 1 & 2.

Project Dates of Sampling:	September 9 – 13, 2013
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List of Acronyms

°C	degrees Celsius
%R	percent recovery
%RSD	percent relative standard deviation
AES	Atomic Emission Spectrometry
AST	aboveground storage tank
B	bias
bgs	below ground surface
CA	Corrective Action
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CLP	Contract Laboratory Program
CO	Contracting Officer
COC	Chain-of-Custody
COR	Contracting Officer Representative
CRQL	Contract Required Quantitation Limits
CSM	Conceptual Site Model
CVAA	Cold Vapor Atomic Absorption
D	absolute range
DQO	Data Quality Objective
ERT	Environmental Response Team
ft	foot
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
gpd	gallons per day
gpm	gallons per minute
HASP	Health and Safety Plan
HRS	Hazard Ranking System
ICP	inductively coupled plasma
IDW	investigation-derived waste
LOD	limit of detection
MDHES	Montana Department of Health and Environmental Sciences
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
NFA	No Further Action
NPL	National Priorities List
NRCS	Natural Resource Conservation Service
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PAL	Project Action Limit
PCB	Polychlorinated biphenyl
P.E.	Professional Engineer
PM	Project Manager
POC	Point of Contact
PQL	Project Quantitation Limit

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List of Acronyms

PPE	Personal Protective Equipment
PTL	Project Team Lead
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
Ra	Radium
RA	Risk Assessment
RAS	Routine Analytical Services
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RL	reporting limit
RM	Removal Manager
RML	Removal Management Levels
RPD	relative percent difference
RSL	regional screening levels
SAP	Sampling and Analysis Plan
SI	Site Inspection
SOP	Standard Operating Procedure
SSL	soil screening level
START IV	Superfund Technical Assessment and Response Team 4
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TBD	to-be-determined
TCL	Target Compound List
TDD	Technical Direction Document
UFP-QAPP	Uniform Federal Policy–Quality Assurance Project Plan
U.S. EPA	United States Environmental Protection Agency
USGS	United States Department of the Interior Geologic Survey
UST	underground storage tank
VOC	volatile organic compound
WAM	Work Assignment Manager
WESTON	Weston Solutions, Inc.

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Introduction

This Sampling Activities Plan (SAP) identifies the data collection activities and associated quality assurance (QA)/quality control (QC) measures specific to the Columbia Falls Aluminum Company (CFAC)(the Site), also known as the Anaconda Aluminum Company Columbia Falls Reduction Plant, located in Columbia Falls, Flathead County, Montana. All data will be generated in accordance with the quality requirements described in the Quality Assurance Project Plan for U.S. EPA Region 8 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site Assessment (QAPP) (Weston 2013). The purpose of this SAP is to describe site-specific tasks that will be performed in support of the stated objectives. This SAP will reference the QAPP for tasks common to all data collection activities including routine procedures for sampling and analysis, sample documentation, equipment decontamination, sample handling, data management, assessment, and data review. Additional site-specific procedures and/or modifications to procedures described in the QAPP are described in the following SAP elements.

This SAP is prepared, reviewed, and approved in accordance with the procedures detailed in the QAPP. Any deviations or modifications to the approved SAP will be documented using Table 1: SAP Revision Form. This SAP is produced in accordance with the Uniform Federal Policy (UFP) for QAPPs and consists of the site-specific UFP Worksheets from the QAPP.

Refer to QAPP Worksheet 3 & 5, and 4, 7, & 8 for an organizational chart, communication pathways, personnel responsibilities and qualifications, and special personnel training requirements.

A crosswalk between this UFP-QAPP and the EPA requirements for QA documents is included in Appendix A. The EPA Region 8 QA Document Review Crosswalk will be cross-referenced between the QAPP and this SAP and show the location of all required quality components within each of the quality documents.

QAPP Reference

Weston Solutions, Inc. 2013. Quality Assurance Project Plan for U.S. EPA Region 8 CERCLA Site Assessment. Prepared for the START IV Contract. July 2013.

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Worksheet 1 & 2 — Title and Approval Page

(UFP-QAPP Manual Section 2.1)
(EPA 2106-G-05 Section 2.2.1)

1. **Project Identifying Information**

   a) **Site Name/Project Name:** Anaconda Aluminum Company Columbia Falls Reduction Plant.

   b) **Site Location/Number:** Columbia Falls, Flathead County, Montana

   c) **Contract/Work Assignment Number:** EP-S8-13-01/TDD 0004/1305-04

2) **List plans and reports from previous investigations relevant to this project.**

   a) *Site History Report*, Montana Department of Health and Environmental Sciences (MDHES), March 5, 1984.

   b) *Sampling Plan for Columbia Falls Aluminum Company, Columbia Falls, Montana*, Ecology and Environment, Inc., March 31, 1988.

   c) *Draft Report of Sampling Activities, Columbia Falls Aluminum Company, Columbia Falls, Montana*, Ecology and Environment, Inc., July 15, 1988.

   d) *Draft Analytical Results Report, Columbia Falls Aluminum Company, Columbia Falls, Montana*, Ecology and Environment, Inc., November 11, 1988.

Lead Investigative Organization's Project Team Lead:	Natalie Quiet/WESTON *Printed Name/Title*
	 Signature/Date
Lead Investigative Organization's Project Manager:	Mark Blanchard, P.G., LEED® AP/WESTON *Printed Name/Title*
	 Signature/Date
Federal Regulatory Agency Delegated Approval Officer/Work Assignment Manager:	Robert Parker/U.S. EPA *Printed Name/Title*
	 Signature/Date

Document Control Numbering System: W.0004.1E.00007

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Worksheet 9 — Project Planning Session Summary
(UFP-QAPP Manual Section 2.5.1 and Figures 9-12)
(EPA 2106-G-05 Section 2.2.5)

Date of Planning Session: May 28, 2013

Location: U.S. EPA Region 8 Headquarters, Denver, CO.

Purpose: Scoping meeting for Columbia Falls Aluminum Company Site Reassessment

Name	Title/Role	Organization	Phone No.	E-mail Address
Robert Parker	WAM/DAO	EPA	303-312-6664	Parker.Robert@epa.gov
Mark Blanchard	Project Manager	WESTON	303-729-6114	Mark.Blanchard@westonsolutions.com
Natalie Quiet	Project Team Lead (PTL)	WESTON	303-729-6124	Natalie.Quiet@westonsolutions.com
Roy Weindorf	PTL for Eureka Solvent Site	WESTON	303-729-6146	Roy.Weindorf@westonsolutions.com

Notes/Comments:

- Site has had polycyclic aromatic hydrocarbons (PAHs) contamination, cyanide detections in groundwater, and the hillside northeast of the Site was devoid of vegetation due to fluoride (check historic aerial photos).
- CFAC has a permit to discharge to the Flathead River.
- CFAC had electric agreement with Bonneville Power Administration
- Possibly trying to re-open the plant. State is pushing current owner, Glencore, to do something with the property.
- Currently, caretaker operation. Plant is shut down.
- State senator recommended discussion with union workers for information on historic operations.
- Waste disposed of on-site until Resource Conservation and Recovery Act (RCRA) was implemented, then waste was shipped off-site.
- Site Inspection Report recommendation was No Further Action (NFA).
- Sampling activities tentatively scheduled for July or August.
- Can e-mail requests to Robert Parker to sub-contract work out if necessary.

Consensus Decisions Made:

- Check to see if they have a current RCRA permit.
- Maintain a database for all data associated/collected with the Site. It will be a deliverable.
- Complete a site-specific QAPP (entire) if Programmatic QAPP is not approved before this sampling plan is due.
- Region 8 Crosswalk is due with the sampling plan.

Action Items:

Action	Responsible Party	Due Date
Draft Sampling and Analysis Plan	Natalie Quiet	July 1, 2013

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Worksheet 9 — Project Planning Session Summary (Continued)

(UFP-QAPP Manual Section 2.5.1 and Figures 9-12)
(EPA 2106-G-05 Section 2.2.5)

Date of Planning Session: June 25, 2013				
Location: U.S. EPA Region 8 Headquarters, Denver, CO.				
Purpose: Scoping meeting for Columbia Falls Aluminum Company Site Reassessment				
Name	**Title/Role**	**Organization**	**Phone No.**	**E-mail Address**
Robert Parker	WAM/DAO	EPA	303-312-6664	Parker.Robert@epa.gov
Natalie Quiet	PTL	WESTON	303-729-6124	Natalie.Quiet@westonsolutions.com

Notes/Comments:

- We will continue to work on the FSPs for CFAC and Eureka sites using the template that I gave you yesterday.
- Discussed onsite underground storage tanks (USTs) and aboveground storage tanks (ASTs).
- Discussed CFACs SW/GW permits to discharge and schematic of such onsite discharges.
- Identified CFAC "hits" wells for potential sampling.
- Reviewed EPA ECHO database.
- Discussed background records review and violations and complaints history.
- Mark Blanchard will follow up with Rob Parker on budgets when he returns from vacation.

Consensus Decisions Made:

- Addition of potential sampling locations to include landfills, sludge pond, leachate ponds, and soaking pits (if possible), and loading/unloading area(s). Will not be collecting air samples.
- Will develop a Conceptual Site Model (CSM) provided information is obtained prior to Draft FSP, otherwise it will be included in the final SR report.

Action Items:

Action	**Responsible Party**	**Due Date**
Create a list of private wells for potential sampling	Natalie Quiet	July 25, 2013
Determine potential sampling locations and/or constituents based on RCRA and Surface water/groundwater permits.	Robert Parker	ASAP
Determine RCRA TSD status	Robert Parker	ASAP
Send aerial photos to Virginia to convey to Union members for potential sampling/source areas identification	Robert Parker	ASAP
Get survey data for CFAC wells from Steve Wright	Robert Parker	ASAP
Send letters to private well owners in Aluminum City for site access and sampling	Robert Parker	ASAP
Evaluate and determine deadlines for document deliverables	Robert Parker	ASAP

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Worksheet 9 — Project Planning Session Summary (Continued)

(UFP-QAPP Manual Section 2.5.1 and Figures 9-12)
(EPA 2106-G-05 Section 2.2.5)

Date of Planning Session: July 22, 2013 **Location:** U.S. EPA Region 8 Headquarters, Denver, CO. **Purpose:** Scoping meeting for Columbia Falls Aluminum Company Site Reassessment				
Name	**Title/Role**	**Organization**	**Phone No.**	**E-mail Address**
Robert Parker	WAM/DAO	EPA	303-312-6664	Parker.Robert@epa.gov
Mark Blanchard	Project Manager	WESTON	303-729-6114	Mark.Blanchard@westonsolutions.com
Natalie Quiet	Project Team Lead	WESTON	303-729-6124	Natalie.Quiet@westonsolutions.com

Notes/Comments:

- Natalie Quiet delivered poster size copies of aerial photos for Robert Parker to deliver to CFAC union workers for identification of potential area of concern for EPA/WESTON to review prior to finalization of the SAP:
  - 1956 – cropped if possible;
  - 1963 – cropped if possible;
  - 1974 CFAC Aerial 3;
  - 1975 Aerial Image;
  - 1980 or later CFAC Aerial 11;
  - 1980 or later CFAC Aerial 7;
  - 1983 CFAC Aerial 6;
  - 1991 CFAC Aerial 13;
  - 1998 CFAC Aerial 4.
- EPA Region 6 team member Jon Rauscher added to CFAC project to evaluate Aluminum Smelter Facility production and contamination issue information. Will develop a remediation assessment of aluminum facilities to aid in assessment of CFAC Site.
- Discussed potential surface water, sediment, source and groundwater sample locations.
- Need to request form for laboratory analyses from Don Goodrich.

Consensus Decisions Made:

- Sample locations will include only surface water, groundwater, sediment and source material locations. No landfills will be sampled. Outfall for the soaking pits is the small North Percolation Pond (Boiler Blowdown Pond) which will be sampled to capture soaking pits contamination.
- Tentative field sampling scheduled for September 9 - 15, 2013.

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Worksheet 9 — Project Planning Session Summary (Continued)

(UFP-QAPP Manual Section 2.5.1 and Figures 9-12)
(EPA 2106-G-05 Section 2.2.5)

Action Items:

Action	Responsible Party	Due Date
Create a table of sampling locations and rationales	Natalie Quiet	July 26, 2013
Create a table of contaminants and sources	Natalie Quiet	July 26, 2013
Draft Sampling and Analysis Plan	Natalie Quiet	August 2, 2013
Receive comments on Draft SAP	Robert Parker	August 23, 2013
Remedial Assessment Report	Jon Rauscher	August 23, 2013
Final SAP	Natalie Quiet	September 6, 2013

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Worksheet 10 — Conceptual Site Model

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Background Information

The Site is located approximately 2.0 miles northeast from the population center of Columbia Falls, Flathead County, Montana, on Aluminum Drive in Township 30N, Range 20W, Section 3 at Universal Transverse Mercator (UTM), coordinates 712139.73 E and 5363972.34 N. The closest residences are approximately 1 mile north, southeast, and west of the Site. According to the 2010 Census (American Fact Finder, www.factfinder2.census.gov), the total population of Flathead County is 90,928 and the total population of Columbia Falls is 1,150. The Site covers approximately 700 acres and is bound by the Flathead River to the south, Teakettle Mountain to the east, Cedar Creek Reservoir to the north, and Cedar Creek to the west. The elevation at the Site is approximately 3,100 feet above mean sea level (amsl). Topography at the Site is generally flat with a southern slope at approximately 3° to 4° with the area north of the site slightly steeper at approximately 5° to 6° (Ecology and Environment, Inc., 1988).

Operational History and Current Conditions

The Anaconda Copper Mining Company built the Anaconda Aluminum Reduction Facility and began production in 1955. The Atlantic Richfield Company (ARCO) purchased the plant in 1978 and operated it until 1985 when it was sold to the Montana Aluminum Investor's Corporation and began operations under CFAC. In 1999, Glencore acquired the company and operated until 2009 when production was curtailed due to poor economic conditions for aluminum production.

The plant is a Vertical Stud Soderberg aluminum reduction facility that uses the Hall Heroult process of producing aluminum in carbon–lined "pots" heated to 960 degrees Celsius (°C). Aluminum oxide is dissolved in a molten cryolite bath and aluminum oxide is reduced to aluminum metal by electrons from direct current through the pot. The molten aluminum is then tapped from the pot and cast into ingots. This process uses 350 megawatts, and 600 pots at 100% production. There are currently 451 pots in place; however the facility has not operated since October 31, 2009.

The Site includes numerous buildings and industrial operating facilities such as offices, warehouses, fabrication, laboratory, washhouse, paste plant, coal tar pitch tanks, pump houses, and the main pot line facility. Features on the Site include percolation ponds, leachate ponds, sludge ponds, sewage treatment ponds, cathode soaking pits, closed and operational landfills (Figure 3).

Previous Investigations and Activities

The Site is an aluminum smelting facility located adjacent to the Flathead River in Columbia Falls, Montana (Figure 1). A Preliminary Assessment (PA) performed on March 5, 1984 by Montana Department of Health and Sciences (MDHES) concluded that hazardous wastes generated onsite were spent halogenated and non-halogenated solvents. Solid wastes included spent potliners, basement sweepings, and air pollution control dusts. A Site Inspection (SI) by Ecology and Environment, Inc. was conducted in 1988. The results of their investigation indicated that high PAHs occurred primarily in soils and sediments and a release to groundwater and surface water of cyanide had occurred, both of which were attributable to plant processes. No release of organic compounds to surface water or

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

groundwater, including the Columbia Falls backup municipal supply well, from the Site had occurred.

Remedial activities that have occurred on the Site include addressing a transformer fire in the rectifier yard that occurred on September 10, 1991. The transformer held approximately 10,000 gallons of dielectric fluid that contain approximately 207 ppm polychlorinated biphenyls (PCBs). Approximately 4,000 gallons spilled into the containment basin and the explosion resulted in the contamination of an approximate 4,000 to 5,000 square-foot area. According to the Remedial Activities Report by Olympus Environmental, Inc., April 14, 1992 the spill area soils and structures were remediated to acceptable levels and no further cleanup was recommended.

In 1994 two capacitors in the West Rectifier Yard Capacitor Bank exploded contaminating steel holding frames and soil with 3 to 4 gallons of pure PCBs. According to CFAC's October, 1994 Storm Water Pollution Prevention Plan (SWPPP) the surrounding capacitors, framing, and soils were removed and disposed of in a certified Toxic Substances Control Act (TSCA) landfill, and the area cleared for operational use.

In February 1998, The State of Montana's Permitting and Compliance Division of the Air & Water Management Bureau requested that CFAC remove all of the spent potliner material (EPA hazardous waste number K088) present in the Wet Scrubber Sludge Pond Landfill due improper disposal of a hazardous waste. Post removal, on July 28, 1998 CFAC sampled the pot diggings material from the Wet Scrubber Sludge Pond Landfill to determine if carbon in the Wet Scrubber Sludge Pond Landfill had been adequately removed. Results of the sampling indicated that cyanide was detected in all of the pot diggings material samples collected (highest concentration 2.1 ppm) and half of the soil samples collected from under the waste pile. The EPA Region III Residential Risk-Based Criteria was 1600 ppm and thus, in October 1998, the State declared no further clean-up action required for the pot diggings material or soil under the pile.

CFAC conducted sampling on September 25, 2011 during suspended plant operations in response to inquiries by the Department of Environmental Quality Air and Waste Management Bureau as to the determination if waste in accumulation is hazardous waste. Materials sampled were anode briquettes, cryolite bath, coal tar pitch, anode dust control bags, potlines sweepings bags, treatment of aluminum crucibles cartridges, paste plant dry coke scrubber bags, and primary gas collection system bags. The analytical results indicated that none of the sampled materials were classified as hazardous waste.

Sources of Known or Suspected Hazardous Waste

The areas described in Table 1, below, are locations within the Site that are known to, or have the potential to, contain hazardous wastes and contaminants based on historical use and previous investigations. The contaminants for all areas within the Site fall into the following analytical groups:

1. Target Analyte List (TAL) Metals and cyanide;
2. Fluoride;
3. Volatile Organic Compounds;

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
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4. Semi-volatile Organic Compounds;
5. Pesticides;
6. PAHs;
7. PCBs;
8. Base/Neutral/Acids.

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Table 1
Site Contamination Sources

Contaminant Source	Description	Associated Contaminants
West Landfill	CFAC operated an unlined solid waste landfill, also known as the West Landfill, from 1955-1981 for which they disposed of general garbage including, paper, scrap from the shops, strapping, steel scrap and scrap wood, and spent potliner (1955-1970). Spent potliner wasn't listed by the U.S. EPA as hazardous waste until 1991. As a result, groundwater monitoring around the landfill had detected elevated concentrations of cyanide, a byproduct of the carbon product pot life. The landfill was capped with a clay cap in approximately 1992 / synthetic cap in 1994 (EPA Presentation). Solvents and hazardous wastes are known to have been buried on-site in the closed landfills (West, Center and Sanitary).	Expected contaminants from the spent potliner landfill are cyanide, fluoride, sodium, aluminum, and carbon inherent of the spent potliner material (Isenberg, 1977) with significant concentrations of cyanide and fluoride. Metals, cyanide, fluoride, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Pesticides, PAHs, and polychlorinated biphenyls (PCBs).
East Landfill	The Spent Potliner Landfill, also known as the East Landfill, operated from approximately 1980-1990 and is a clay-lined landfill used to dispose of spent potliners prior to their declaration as a hazardous waste. The landfill was capped with a synthetic cap and revegetated.	Expected contaminants from the spent potliner are cyanide, fluoride, sodium, aluminum, and carbon inherent of the spent potliner material (Isenberg, 1977) with significant concentrations of cyanide and fluoride.
Wet Scrubber Sludge Pond Landfill	Wet Scrubber Sludge Pond Landfill was closed in approximately 1999 and contained sludge waste generated from the Wet Scrubber System and for a period from approximately 1994-1998 contained spent potliner material. The landfill was recontoured, covered with native soil and revegetated with native grasses.	Expected contaminants from the landfill are briquette coke and pitch condensate solids, cyanide, fluoride, sodium, aluminum, carbon, nickel (present in petroleum coke), chromium, beryllium, copper, zinc (used to manufacture aluminum metal alloys), coal tar volatiles (Benzo(a)pyrene, benzene, ethyl benzene, and toluene), alumina and carbon solids, and calcium. TCLP analysis has shown no detectable toxic constituents in the scrubber solids.

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Contaminant Source	Description	Associated Contaminants
Center Landfill	The Center Landfill, also known as the Carbon Pile, is an unlined landfill operated from approximately 1970-1980. Solvents and hazardous wastes are known to have been buried on-site in the closed landfills (West, Center and Sanitary)	Carbon, potentially metals, cyanide, fluoride, VOCs, SVOCs, Pesticides, PAHs, and PCBs. It is unknown if other materials are present.
Sanitary Landfill	The Sanitary Landfill is a clay-lined historic landfill used for plant garbage. The landfill was covered with soil and revegetated. Years of operation unknown. Solvents and hazardous wastes are known to have been buried on-site in the closed landfill (West, Center and Sanitary).	Potentially metals, cyanide, fluoride, VOCs, SVOCs, Pesticides, PAHs, and PCBs. It is unknown if other materials are present.
Asbestos Landfill	Based on a review of aerial photography the Asbestos Landfill began operation in approximately the early 2000's; date last used is unknown.	Asbestos
Industrial Landfill	The Industrial Landfill is an active landfill that receives non-hazardous waste and debris.	None identified

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
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Contaminant Source	Description	Associated Contaminants
North and South Leachate Ponds	Two hypalon-lined leachate ponds were constructed on opposite ends of the East Landfill in 1980, one on the north side of the landfill (North Leachate Pond) and one on the south side of the landfill (South leachate Pond). The ponds were used to collect runoff water from the East Landfill containing the spent potliner material and aerated during the summer months to reduce water volume and utilize ultraviolet light to break down the cyanide. According to a letter from Donald F. Ryan, Laboratory Manager at CFAC, to MDEQ dated January 5, 1990, approximately 150,000 gallons of leachate water containing fluoride and approximately 3 mg/L of cyanide was drained from the South Leachate Pond into the Wet Scrubber Sludge Pond Landfill. The South leachate Pond was dried, capped, and subsequently closed in 1993. An underground pipe leads from the North Leachate Pond to the Wet Scrubber Sludge Pond. The North Leachate Pond held cyanide-free water containing fluoride and was subsequently drained into the Wet Scrubber Sludge Pond Landfill. The North Leachate Pond was capped and then closed in 1994.	Expected contaminants from the spent potliner landfill contained in the leachate ponds are cyanide and fluoride.
North Percolation Ponds	The North Percolation Ponds (smaller pond receives direct discharge, larger pond is overflow) receive wastewaters from the Paste Plant Briquette Quench system, Paste Plant Ball Mill Bearing Cooling system, Wet Scrubber Blowdown, Air Compressor Cooling, Air Compressor Condensate Blowdown, Masonry Shop, and Battery Shop. Prior to 1978 the waste effluent from the soaking of the carbon cathodes was piped to the North Percolation Pond, also known as the Boiler Blowdown Pond (smaller pond).	Expected contaminants from these locations are nickel (present in petroleum coke), chromium, beryllium, copper, zinc (used to manufacture aluminum metal alloys), suspended solids, soluble oils, coal tar volatiles (Benzo(a)pyrene, benzene, ethylbenzene, and toluene), lube oil, aluminum, antimony alumina and carbon solids, soluble fluoride, battery acid, grease, and solvent residues.

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Contaminant Source	Description	Associated Contaminants
West Percolation Pond	The West Percolation Pond receives wastewater from the Laboratory Sinks and stormwater from the Administration, Laboratory, and Change House areas via the dry wells.	Expected contaminants from these locations are alumina and carbon suspended solids, soluble fluoride, hydraulic oil, and any laboratory chemicals.
South Percolation Ponds	The South Percolation Ponds receive wastewaters from the Rectifier Oil Separator Sump, Sewage Treatment Plant, contact cooling water from direct chill casting of aluminum ingots, and Fabrication Shop Steam Cleaning Bay.	Expected contaminants from these locations are suspended solids, soluble oils, soluble fluoride, chlorine, and raw sewage. Expected contaminants from these processes are alumina and carbon suspended solids, soluble fluoride, hydraulic oil, bezo(a)pyrene, antimony, nickel, aluminum, and fluoride.
Stormwater Runoff	Stormwater from the Mechanical Shop, Administrative Buildings, and Rod Mill, and non-contact cooling water from the electromelt process, laboratory instruments, heat pumps, fire pump engine, non-contact air conditioner condensate, fire hydrant bleed system, blowdown from nine package boiler plants and softener regeneration drain to Class V injection wells (dry wells).	Not yet determined
Storage Tanks	There are several underground and above ground storage tanks located throughout the property that house diesel and gasoline. One 3500 gallon UST is located north of the potlines, one 500 gallon AST is located at the Mechanical Shops forge, one 2000 gallon AST is located behind the Paste Plant, and one 500 gallon AST is located at the Compressor House, all containing diesel fuel. One UST of unknown size is located north of the potlines and contains unleaded gasoline. Two 1000 gallon ASTs are located in the Garage Oil Shed with one containing hydraulic oil and one containing motor oil.	Unleaded gasoline and diesel fuels

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Contaminant Source	Description	Associated Contaminants
West Landfill, Center Landfill, and Sanitary Landfill	Solvents and hazardous wastes are known to have been buried on-site in the closed landfills.	Metals, cyanide, fluoride, VOCs, SVOCs, Pesticides, PAHs, and PCBs.
Rectifier Yard Transformer	A transformer fire in the rectifier yard occurred on September 10, 1991. The transformer held approximately 10,000 gallons of dielectric fluid that contain approximately 207 ppm polychlorinated biphenyls (PCBs). Approximately 4,000 gallons spilled into the containment basin and the explosion resulted in the contamination of an approximate 4,000 to 5,000 square-foot area. The spill area soils and structures were remediated to acceptable levels and no further cleanup was recommended.	PCBs
West Rectifier Yard Capacitor Bank	In 1994 two capacitors in the West Rectifier Yard Capacitor Bank exploded contaminating steel holding frames and soil with 3 to 4 gallons of pure PCBs. The surrounding capacitors, framing, and soils were removed and disposed of in a certified Toxic Substances Control Act (TSCA) landfill, and the area cleared for operational use.	PCBs
Industrial By-products Area	The Industrial By-products area and numerous waste piles have been identified in various locations throughout the Site.	Unknown. Potential contaminants from spent potliner: cyanide, fluoride, sodium, aluminum, and carbon.
Cathode Soaking Pits	Carbon cathode soaking pits contained water and ammonia to expedite the carbon removal process.	Metals, cyanide, fluoride, VOCs, SVOCs, Pesticides, PAHs, PCBs, and BNA

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Contaminant Source	Description	Associated Contaminants
Material Loading/Unloading Areas	Loading docks, material storage areas.	Metals, cyanide, fluoride, VOCs, SVOCs, Pesticides, PAHs, PCBs, and BNA

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

Physical Characteristics

Regional Climate

There is a meteorological data station (#248902) in Whitefish, Montana and monthly climate data is available from November 1, 1939 through March 29, 2013. Average winter temperatures in the Whitefish area range from 16.0 °F to 54.6 °F and average summer temperatures range from 30.0 °F to 81.5 °F. The average annual high temperature is 54.7 °F. Average annual precipitation is 21.75 inches with most occurring during the summer and winter monsoon seasons (Western Regional Climate Center, 2013).

Geologic and Hydrogeologic Setting

Geology

According to the Draft Analytical Results Report by Ecology and Environment, Inc., November 11, 1988, "the Site is located approximately 1/2 mile northwest of Badrock Canyon. Teakettle Mountain, the principle geologic feature in the area located adjacent to and east of the Site is comprised of primarily Precambrian undifferentiated sedimentary strata of the Ravalli Group superimposed by the Piegan Group dolomites (Hydrometrics, 1985).

The Quaternary stratigraphy near the Site is locally complicated due to the heterogeneous nature or glacial and alluvial deposits. Based on well logs from the Site, bedrock is estimated to be variable from 145 feet to 300 feet.

Alden (1953) suggests the area near Columbia Falls is underlain by primarily glacial till deposited by the Cordilleran Ice Sheet. Konizeski (1968) further suggests that the substratum near Columbia Falls is characterized by "ice-contact, drumlin-forming clay and boulder till; locally overlain by glaciolacustrine deposits". The glaciolacustrine deposits mentioned by Konizeski (1968) are those derived by Glacial Lake Missoula. Based on local well logs, the glacial drift, glacial till and glaciolacustrine deposits are inferred to be interfingered at and near the Site. Pleistocene glaciofluvial outwash and recent alluvial deposits overlying the glacial stratigraphy are found to exist near the southern border of the Site. Additional alluvial deposits can be found in the Cedar Creek floodplain (Figure 2). Hydrometrics (1985) suggest that "the Flathead River and Cedar Creek flow primarily through Recent alluvium consisting dominantly of silt and sands comprising the modern floodplains"."

Hydrogeology

In their November 1988 report, Ecology and Environment, Inc. reported that "the Flathead Valley has undergone several distinct erosional, depositional and geologic events. Ground water occurrence and distribution in the Flathead Valley is largely dictated by Precambrian bedrock, Pleistocene Glacial Deposits and recent alluvially deposited materials. The nature of glacially and alluvially deposited materials in the Flathead Valley results in a very complex hydrogeologic setting.

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

The Pleistocene glacial deposits mantle most if not all of the Flathead Valley. The glacially deposited material influences greatly the occurrence and distribution of ground water in the valley. Due to the complex depositional nature of the glacial, peri-glacial, glaciofluvial and glaciolacustrine deposits in the valley, ascertaining exact hydrogeologic relationships of aquifer systems is difficult. Konizeski, et.al. (1968) identified five major aquifer systems within the Flathead Valley. For continuity, the terminology of Konizeski, et.al. (1968) will be retained for describing the regional hydrogeologic setting; however, this scheme may not strictly apply when evaluating the aquifer of concern.

Hydrometrics (1985) installed a series of piezometers in order to gain a better understanding of onsite subsurface depositional relationships. The piezometers "show a succession of till and small patches of glaciolacustrine clays, capped by from one foot to greater than twelve feet of imbricated glaciofluvial and alluvial sands, gravels and cobbles. This capping unit appears to be more extensive and thicker north and west of the plant complex than it is to the northeast." The retrieval of cutting samples during drilling confirmed the heterogeneous nature of the substratum. Drillers logs obtained from the MDNRC provide more evidence of the complex heterogeneous depositional modes. The logs indicate that from 70 to more than 300 feet of interbedded glacial, glaciofluvial and glaciolacustrine sediments underlie the Site. Extrapolation of the logs also indicates that these glacially related units are vertically and laterally discontinuous. A buried glacial outwash channel, consisting of cobbles and gravels emanating from Badrock canyon and evident along this southern border of the Site, is host to a highly transmissive water bearing zone at depths greater than 100 feet. The depth to ground water is variable at the site. Water table depths of 15 feet are evident in CFAC monitoring wells located approximately 100 feet north of the Flathead River. Additionally, a ground water level of 100 feet was recorded by Hydrometrics (1985) in a test well located between the East Landfill (spent potliner landfill) and the Wet Scrubber Sludge Pond (Figure 2). Both water level measurements were taken in August, 1985. Extrapolation of water level measurements (Hydrometrics 1985) indicates a southwest ground water flow direction.

As part of the objectives of the investigation conducted by Ecology and Environment, Inc. to assess the local groundwater flow direction, four on-site wells were surveyed and vertical elevations established. The surveyed wells included CF-MW-1, CF-MW-2, TW-2, and TW-8 and were utilized to provide the best hydrogeologic coverage of the Site. The elevations at each well were measured at a reference mark on the well using a Leitz Sokkisha C3A Automatic Level. A United States Department of the Interior Geologic Survey (USGS) benchmark relating true elevation in the area was unavailable, thus a marked elevation of 3111.41 feet was taken from the CFAC sewage treatment facility located south of the plant buildings. From this reference point, the above specified wells were surveyed by closed loop traverse for potentiometric contouring purposes.

Based on water level data, elevation data, field observations and water quality data collected by Ecology and Environment, Inc. in 1988, a potentiometric surface map of the shallow alluvial aquifer at the plant was prepared and infers groundwater flow, due to a lack of data points in certain areas, as generally flowing southwest toward the river. Correlation of this potentiometric contour map is very consistent to the potentiometric contour map prepared by Hydrometrics (1985).

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Worksheet 10 — Conceptual Site Model (Continued)

(UFP-QAPP Manual Section 2.5.2)
(EPA 2106-G-05 Section 2.2.5)

An aquifer test conducted by Hydrometrics indicated that ground water yields at the Site are highly variable ranging from over 1500 gallons per minute (gpm) to only a few gpm. Wells yielding greater quantities of ground water are those located closer to the Flathead River. This large variability in ground water yield is due to the heterogeneous nature of glacial deposits underlying the Site. Commensurate to ground water yield, Hydrometrics also established transmissivities ranging from several thousand gallons per day per foot (gallons per day [gpd]/foot [ft]) to less than 100 gpd/ft.

Recharge to ground water beneath the Site occurs by precipitation infiltration and infiltration of ephemeral streams on the west flank of Teakettle Mountain, and by surface water from Cedar Creek. Groundwater discharge is principally to the Flathead River. Groundwater discharge also occurs by withdrawal from wells in the area. Water rights data obtained from the MDNRC show that there are approximately 445 domestic wells utilized by households within four miles downgradient of the Site. Of the 445 domestic wells downgradient of the Site, 30 wells are used by a small grouping of 33 homes located 1 mile west of the CFAC plant." As part of the current investigation, surrounding well use information will be updated.

The city of Columbia Falls utilizes two municipal ground water wells as a primary potable water supply (alternating between the two for approximately 50% utilization on each). The two municipal wells (Louisiana Pacific Well and Clare Park Well) are located within the Columbia Falls city limits. The Clare Park Well is located approximately ¾ mile west of the Flathead River and approximately 2 miles downgradient of the Site and is completed within the Cedar Creek Aquifer with a screened interval of 151-256 feet below ground surface (bgs). The back up well (municipal well 4) is located west of Columbia Falls and approximately 3 1/4 miles southwest of the Site. (Ecology and Environment, Inc., November 1988)

Environmental and/or Human Impact

Historic industrial activities and resulting burial of potentially hazardous materials may have impacted soil, sediment, groundwater, and surface water in the area with concentrations of heavy metals, cyanide, fluoride, VOCs, SVOCs, PAHs, PCBs, and pesticides that could potentially exceed area background concentrations and/or Montana regulatory standards.

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Worksheet 11 — Project/Data Quality Objectives

(UFP-QAPP Manual Section 2.6.1)
(EPA 2106-G-05 Section 2.2.6)

1. State the Problem

Remnants of historical industrial activities are present within the Site, which include numerous buildings and industrial operating facilities such as warehouses, fabrication, laboratory, paste plant, coal tar pitch tanks, pump houses, the main pot line facility, percolation ponds, leachate ponds, sludge ponds, sewage treatment ponds, cathode soaking pits, closed and operational landfills. The Site has historically had contamination to soils, sediments, and groundwater that include PCBs, PAHs, heavy metals, cyanide, and fluoride, all of which were attributable to plant processes as described in the previous investigations conducted on the Site and described in the Worksheet 10. Potential contaminants related to historic site use include VOCs, SVOCs, and pesticides. Historical industrial activities may have resulted in a release of hazardous substances to the environment. An observed release is part of the Site Inspection objectives under CERCLA (Guidance for Performing Site Inspections Under CERCLA, EPA/540-R-92-021 [EPA, 1992]). This Site Reassessment is needed to evaluate if a release has occurred, if Hazard Ranking System (HRS) scoring determines the Site eligible for the National Priorities List (NPL), and to determine if future actions at the Site are warranted.

This investigation will involve the generation of definitive data for surface water, groundwater, sediment, and waste source material. All definitive analytical methods employed for this project will be methods approved by the EPA.

2. Identify the Goals of the Study

Identifying the goal of the study involves establishing principal study questions, actions that may result from answering the questions, and development of decision statements that will be used to resolve principal study questions. In addition, potential outcomes requiring new environmental data to address the problem statement may result from decision statements, if the goals are limited in scope.

Principal study questions: The field sampling as outlined in this SAP will be conducted to provide data as needed at the site to determine:

1) Using laboratory analysis, has an observed release (based on the CERCLA definition [EPA, 1992]) of metals and cyanide, fluoride, VOCs, SVOCs, PAHs, PCBs, and/or pesticides occurred to sediments, surface water, or groundwater at the Site as a result of historic industrial activities (i.e., are any contaminants present in the sediments, surface water or groundwater in concentrations greater than three times background?)

2) What are the contaminant levels at background locations?

3) What are the current groundwater flow patterns?

Actions that could result from resolution of study questions: Additional investigation will be recommended if an observed release is identified and concentrations of contaminants exceed

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Worksheet 11 — Project/Data Quality Objectives (Continued)

(UFP-QAPP Manual Section 2.6.1)
(EPA 2106-G-05 Section 2.2.6)

potential action levels and/or HRS scoring results in NPL of the Site..

Decision Statement:

1) Do Base/Neutral/Acid results indicate a potential for leaching from waste source material?

2) Do the contaminants exceed background or regulatory standards?

3) If contamination of environmental media is found in excess of action levels protective of human health and/or the environment and/or HRS scoring ranks the site as eligible for NPL, then options for further site characterization, remediation, or alternative uses of the site will be recommended.

4) What are the potential exposure pathways based on characterization of groundwater flow patterns and direction of contaminant migration in groundwater?

3. Identify Information Inputs

Identification of information inputs is necessary to determine aspects of data that need to be measured in order to support the decision statements. The main components to this step consist of the following:

- Identification of the types and sources of information needed to support decision statements.
- Specification of inputs that require new environmental data.
- Determination of the appropriate sampling and analytical methods.

Information and actions required to resolve the study question(s): Groundwater elevations will be obtained from all wells onsite to aid in the determination of groundwater flow patterns at the Site. Laboratory analyses of sediment, waste source, surface water, and groundwater will be collected to identify if a release has occurred. The following are AOCs for all media at the Site:

1. TAL Metals (total and dissolved for water);
2. Fluoride;
3. VOCs;
4. SVOCs;
5. Pesticides;
6. PAHs;
7. PCBs;
8. Base/Neutral/Acids.

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Worksheet 11 — Project/Data Quality Objectives (Continued)

(UFP-QAPP Manual Section 2.6.1)
(EPA 2106-G-05 Section 2.2.6)

Total TAL metals analyzed include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc, and cyanide.

Source(s) for information:

1. Approximately 6 co-located surface water and sediment samples, 3 co-located surface water and waste source samples, and 10 groundwater well samples will be in and around features that appear to be associated with industrial activities shown on Figure 3. In addition, 6 background co-located sediment and surface water, and 2 background groundwater samples will be collected. There are 4 potential background co-located surface water and sediment locations that have been identified; 2 to 3 of these locations will be utilized based on accessibility in the field.
2. Groundwater elevations will be obtained from all wells onsite to aid in the determination of groundwater flow patterns at the Site.
3. Analytical results of collected surface water samples from the Site.
4. Analytical results of collected groundwater samples from the Site.
5. Analytical results of collected sediment samples.
6. Analytical results of collected waste source samples.

Confirm that measurement methods exist to provide data: Definitive analytical methods available for sediment, waste source, surface water, and sediment matrices samples include EPA Method ISM01.3 (TAL metals including mercury and cyanide); EPA Method SOM01.2 (VOCs, SVOCs, PAHs, and pesticides); and EPA 300.0/Standard Method 3111D (Fluoride); EPA Method 8082A (PCBs); EPA Method 625 (Base/Neutral/Acids).

Define the Boundaries of the Study

Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.

Specific characteristics that define the population being studied: The specific characteristics of the population being investigated are the concentrations of the contaminants in samples collected from sediment, waste source, surface water, and groundwater at the Site.

Spatial boundary of the decision statement: The spatial boundaries of the study area are defined by the disturbance areas at the Site. Surface water samples will be collected from the Flathead River, Cedar Creek, Cedar Creek Reservoir Overflow Drainage, and residential wells within Aluminum City relative to the Site. Groundwater samples will be collected relative to the potential source areas at the Site.

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Worksheet 11 — Project/Data Quality Objectives (Continued)

(UFP-QAPP Manual Section 2.6.1)
(EPA 2106-G-05 Section 2.2.6)

The vertical boundary of sediment/waste source sampling is 0 to 6 inches below ground surface (bgs). The vertical boundary of surface water samples is 0 to 1 feet below the water surface. The vertical boundary of groundwater samples is the depth below the water surface at which the dedicated pumps are installed and will vary by well.

Temporal limit and scale of inference of the decision statement: A sampling schedule and sampling plan to include the media to be collected is described as Worksheet 14 & 16 and Worksheet 17.

Practical constraints on data collection: Collection of surface water samples is contingent on water being present in Cedar Creek, Cedar Creek Reservoir Overflow Drainage, and the North and South Percolation Ponds. Collection of groundwater samples is contingent on waster being present within the wells to be sampled. However, certain inclement weather conditions may result in restricted site access if precipitation events are exceptionally severe and/or occur near scheduled sampling time. Scheduling adjustments will be made if forecasted weather during planned field events is expected to adversely impact access or field crew safety. Access to the residential wells and the Site itself are through private property and will require an access agreement and possibly an escort and will be coordinated with the EPA and property owners.

4. Develop the Analytic Approach

Development of an analytical approach involves the designation of action levels and use in evaluating decision rules. Each decision rule is a logical "if...then" statement defining conditions that would cause the decision maker to choose among alternative actions. The analytical approach for the study will utilize threshold values as the population parameter for decision making. The thresholds will be used as Action Levels for soil, sediment, and water.

Develop a logical "if...then" statement that defines the conditions that would cause the decision maker to choose among alternative actions.

Action Levels:

Preliminary regulatory action levels for TAL metals, fluoride, VOCs, SVOCs, PAHs, PCBs, and pesticides in sediment, waste source, and surface water will be EPA Regional Screening Levels (RSLs) for residential and industrial soil (EPA 2013).

Preliminary regulatory action levels for TAL metals, fluoride, VOCs, SVOCs, PAHs, PCBs, and pesticides in groundwater will be the MDEQ's Water Quality Standards (QAPP, Appendix B).

Decision Rules:

1) If an observed release is indicated, data will be compared to appropriate regulatory standards and recommendations for future site characterization/assessment will be made. An observed release for TAL metals, fluoride, VOCs, SVOCs, PAHs, PCBs, and/or pesticides at the Site will be identified if anyone of the following occurs:

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Worksheet 11 — Project/Data Quality Objectives (Continued)

(UFP-QAPP Manual Section 2.6.1)
(EPA 2106-G-05 Section 2.2.6)

- Laboratory analysis of sediment/waste source samples is equal to or greater than three times the background mean.
- Laboratory analyses of the downstream sediment sample are equal to or greater than three times the upstream sediment sample(s) mean.
- Laboratory analysis of surface water and groundwater samples is equal to or greater than the upstream/upgradient concentrations.
- Laboratory analyses of the water from the percolation ponds samples are equal to or greater than the EPA RSLs.

All laboratory data packages will be verified and validated using a Stage 2A validation, as described in the EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (January 2009) (QAPP, Appendix N).

5. **Specify Performance or Acceptance Criteria**

Specify the decision as a statistical hypothesis test, examine consequences of making incorrect decisions from the test, and place acceptable limits on the likelihood of making decision errors.

Determine the possible range of the parameter(s) of interest: Use of biased sampling points such as potential hot spots as indicated by previous investigations and site features, or stream/riverbed samples adjacent to industrial site features, precludes statistical determination of limits on decision errors. Measurement error, rather than sampling error, is deemed the primary factor affecting any decision error. Verified, definitive data will be required to evaluate measurement error. Sampling error will be limited to the extent practicable by following approved EPA methods and applicable standard operating practices. Sampling error and tolerable limits cannot be quantified.

6. **Develop the Detailed Plan for Obtaining Data**

Identify the most resource-effective sampling and analysis design for generating data that are expected to satisfy the Data Quality Objectives (DQOs).

Sample locations will be selected based on historic industrial practices to identify the presence and approximate extent of contamination. Sediment, surface water, and groundwater sample locations will be placed in upstream/upgradient and downstream/downgradient locations relative to the Site as well as adjacent to specific industrial site features that have the potential of impacting the watershed. The detailed plan for obtaining data is presented in Worksheet 17 – Sample Design and Rationale. Analysis design requirements are presented in QAPP Worksheets 19, 20, 24-28, and 30.

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Worksheet 14 & 16 —Project Tasks & Schedule
(UFP-QAPP Manual Section 2.8.2)
(EPA 2106-G-05 Section 2.2.4)

Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)	Deliverable Due Date
Develop a Draft SAP and the EPA Region 8 QA Document Review Crosswalk	WESTON	June 28, 2013	August 2, 2013	Draft SAP and the Draft EPA Region 8 QA Document Review Crosswalk	August 2, 2013
Address EPA comments on Draft SAP and the Draft EPA Region 8 QA Document Review Crosswalk	WESTON	August 26, 2013	August 30, 2013	Final SAP and the Final EPA Region 8 QA Document Review Crosswalk	August 30, 2013
Develop Health and Safety Plan (HASP)	WESTON	August 26, 2013	August 30, 2013	NA	NA
Sample Collection Tasks	WESTON	September 5, 2013	September 9, 2013	Field Notes	NA
Analytical Tasks	WESTON	September 16, 2013	September 30, 2013	Draft Site Reassessment Report	October 11, 2013
Quality Control Tasks	WESTON	September 16, 2013	September 30, 2013	Draft Site Reassessment Report	October 11, 2013
Validation	WESTON	September 16, 2013	October 11, 2013	Draft Site Reassessment Report	October 11, 2013

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Worksheet 14 & 16 —Project Tasks & Schedule (Continued)
(UFP-QAPP Manual Section 2.8.2)
(EPA 2106-G-05 Section 2.2.4)

Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)	Deliverable Due Date
Summarize Data	WESTON	September 16, 2013	October 11, 2013	Draft Site Reassessment Report	October 11, 2013
Draft HRS Quickscore	WESTON	September 16, 2013	October 11, 2013	Draft HRS Quickscore Report	October 11, 2013
Draft Site Reassessment Report	WESTON	September 16, 2013	October 11, 2013	Draft Site Reassessment Report	October 11, 2013
Address EPA comments on Draft Report	WESTON	Upon receipt of comments from EPA/TBD	Two weeks after comments from EPA are received/TBD	Final Site Reassessment Report/HRS Quickscore Report	Two weeks after comments from EPA are received/TBD

Note – All dates presented in the table are planned dates and are subject to change given uncertainties such as inclement weather, laboratory reporting, etc. that can affect actual completion of the tasks described.

Site access agreements will be managed by the EPA WAM.

Sampling activities, including sample collection, sample preparation, and sample documentation will be performed by WESTON START.

Laboratory analytical services will be provided by Contract Laboratory Program (CLP) laboratory. Laboratory result turnaround time (TAT) will be standard 10 business days.

All analytical data will undergo verification and validation by WESTON START as described in QAPP Worksheets 34-37

Reports to management will be written and distributed in accordance with the QAPP Worksheet 9.

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Worksheet 15 — Project Action Limits and Laboratory-Specific Detection/Quantitation Limits

(UFP-QAPP Manual Sections 2.6.2.3 and Figure 15)
(EPA 2106-G-05 Section 2.2.6)

Matrix: Sediment/Waste Source
Analytical Method: All
Concentration level (if applicable): All

Analyte[1]	**PAL**[2,3,4,5]	**PAL Reference**[2,3,4,5]	Project Quantitation Limit **(PQL) Goal**[5]	**Laboratory Quantitation Limit/CRQL**[1]	**Laboratory Detection Limit**[5]
TAL Metals	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
Fluoride	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
VOCs	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
SVOCs	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
PAHs	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
PCBs	EPA RSL/EPA Eco SSL/ESL		TBD		TBD
Pesticides	EPA RSL/EPA Eco SSL/ESL		TBD		TBD

Note:
EPA RSL = U.S. EPA Regional Screening Level, Residential Soil, May 2013.
EPA Eco SSL = U.S. EPA Ecological Soil Screening Level, April 2005 available at http://cfpub.epa.gov/ecotox/.
ESL = U.S. EPA Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) Ecological Screening Levels (ESLs), August 2003.

1 CLP laboratories use accepted analytical methods for the isolation, detection, and quantitation of specific target compounds and analytes. The CLP Target Compound List TCL, TAL, and their corresponding Contract Required Quantitation Limits (CRQL) are listed in QAPP Appendix E and QAPP Appendix F, respectively.

2 Links to State regulatory cleanup standards are provided in QAPP Appendix B, and EPA residential and industrial RSLs, EPA Eco SSLs, and ESLs are provided in Appendix C.

3 For the purpose of contracting with the analytical laboratory, the PAL (Preventative Action Limit) is the lesser of "EPA RSL", "EPA Eco SSL", or "ESL".

4 For compounds where the PAL is lower than the limit of detection (LOD) achievable by the laboratory, the LOD will be used as the screening criteria for review of analytical results.

5 Terminology and limits are laboratory-specific.

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Worksheet 15 — Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (Continued)

(UFP-QAPP Manual Sections 2.6.2.3 and Figure 15)
(EPA 2106-G-05 Section 2.2.6)

Matrix: Surface Water/Groundwater
Analytical Method: All
Concentration level (if applicable): All

Analyte[1]	PAL[2,3,4,5]	PAL Reference[2]	PQL Goal[5]	Laboratory Quantitation Limit/CRQL[1]	Laboratory Detection Limit[5]
TAL Metals	MDEQ WQS/EPA MCL		TBD		TBD
Fluoride	MDEQ WQS/EPA MCL		TBD		TBD
VOCs	MDEQ WQS/EPA MCL		TBD		TBD
SVOCs	MDEQ WQS/EPA MCL		TBD		TBD
PAHs	MDEQ WQS/EPA MCL		TBD		TBD
PCBs	MDEQ WQS/EPA MCL		TBD		TBD
Pesticides	MDEQ WQS/EPA MCL		TBD		TBD

Note:
EPA MCL = U.S. EPA Maximum Contaminant Level, Groundwater, May 2013.
MDEQ WQS = Montana Department of Environmental Quality (MDEQ) Circular DEQ-7 Numeric Water Quality Standards (WQS), August 2003.

1 CLP laboratories use accepted analytical methods for the isolation, detection, and quantitation of specific target compounds and analytes. The CLP TCL, TAL, and their corresponding CRQL are listed in QAPP Appendix E and QAPP Appendix F, respectively.

2 Links to State regulatory standards are provided in QAPP Appendix B and EPA MCLs are provided in Appendix C.

3 For the purpose of contracting with the analytical laboratory, the PAL (Preventative Action Limit) is the lesser of “MDEQ WQS” or “EPA MCL”.

4 For compounds where the PAL is lower than the LOD achievable by the laboratory, the LOD will be used as the screening criteria for review of analytical results.

5 Terminology and limits are laboratory-specific.

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Worksheet 17 — Sampling Design and Rationale

(UFP-QAPP Manual Section 3.1.1)
(EPA 2106-G-05 Section 2.3.1)

Background Sample Locations

Six discrete background sediment (CF-SD-01, CF-SD-02, and CF-SD-09 – CF-SD-12), six background surface water (CF-SW-01, CF-SW-02, and CF-SW-09 – CF-SW-12), and 2 background groundwater grab samples will be collected in a geologically, hydrologically, and hydrogeologically similar area, respectively, near the Site, but outside the influence of industrial activities. The background surface water and sediment samples will be collected as grab samples and data will be used to identify the mean background concentrations of metals, fluoride, VOCs, SVOCs, PCBs, PAHs, and pesticides and for comparison against sediment, waste source material, and surface water. The background groundwater samples will be collected as discrete samples from the existing monitor wells utilizing the dedicated sampling equipment present in those wells. The data from groundwater samples will be used to identify the mean background concentrations of metals, fluoride, VOCs, SVOCs, PCBs, PAHs, and pesticides and for comparison against groundwater. In addition, a potential background residential groundwater sample may be collected and will be collected as a discrete sample from the residential tap at that location. The data from the residential background sample will be used to identify the mean residential background concentrations of the aforementioned analytical groups and for comparison against residential groundwater. The background samples will be analyzed for TAL metals, fluoride, VOCs, SVOCs, PCBs, PAHs, and pesticides to determine background concentrations.

Sample Locations

Sample locations are biased to identify TAL metals, fluoride, VOCs, SVOCs, PCBs, PAHs, and pesticides concentrations of sediment, waste source, surface water and groundwater associated with the Site and to determine if these media may be transporting unacceptable contaminant concentrations into the Flathead River and its tributaries, Cedar Creek and Cedar Creek Reservoir Overflow Drainage, and/or groundwater. The sediment, waste source, surface water, and groundwater sample quantities to be collected at the Site were determined based on industrial related features and migratory pathways. Sample locations are depicted in Figures 3. Table 2 presents the planned sample quantities and parameters to be analyzed by sample matrix. In addition, requirements for the sample container, volume, preservation, and QC samples are presented in Table 2.

Surface Water and Sediment

A total of 12 co-located sediment and surface water grab samples will be collected upstream from the Site, adjacent to observed site features, and downstream from the Site, and will be collected using disposable equipment. These samples are meant to identify if an observable difference in upstream and downstream concentrations of contaminants are present to determine if contaminants at the Site are migrating to the Flathead River. The following sample locations have been selected (Figure 3):

- Co-located surface water and surface sediment samples will be collected from Cedar Creek, Cedar Creek Reservoir Overflow Drainage, and the Flathead River at the following locations:

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Worksheet 17 — Sampling Design and Rationale (Continued)

(UFP-QAPP Manual Section 3.1.1)
(EPA 2106-G-05 Section 2.3.1)

- Upstream of the Site to identify concentrations of contaminants in Cedar Creek prior to the Site (co-located surface water and sediment samples: CF-SW-01 and CF-SD-01).
- Upstream of the Site to identify concentrations of contaminants in Cedar Creek Reservoir Overflow Drainage prior to the Site (co-located surface water and sediment samples: CF-SW-02 and CF-SD-02).
- Downstream of the Site to identify if contaminants are migrating via overland flow to Cedar Creek (co-located surface water and sediment samples: CF-SW-03 and CF-SD-03).
- Downstream of the Site to identify if contaminants are migrating via overland flow to Cedar Creek Reservoir Overflow Drainage (co-located surface water and sediment samples: CF-SW-04 and CF-SD-04).
- Downstream of the Site to identify if contaminants are migrating offsite to Flathead River (co-located surface water and sediment samples: CF-SW-05 and CF-SD-05.
- Adjacent to Flathead River to determine if onsite contaminants are migrating downgradient to the Flathead River (co-located surface water and sediment samples: CF-SW-06 and CF-SD-06 through CF-SW-08 and CF-SD-08). CF-SW-06 and CF-SD-06 located in surface water and groundwater mixing zone near the inflow point of groundwater discharge from entire Site, including South percolation Ponds.
- Upstream of the Site to identify concentrations of contaminants in the Flathead River prior to the Site (co-located surface water and sediment samples: CF-SW-09 and CF-SD-09 through CF-SW-12 and CF-SD-12). Four background locations have been chosen based on river access points identified in a review of aerial photography; 2 to 3 of these locations will be utilized based on accessibility in the field.

Surface Water and Waste Source

Three co-located sediment and surface water grab samples will be collected upgradient of the Flathead River, adjacent to observed site features, and downgradient from the Site. These samples are meant to determine contaminant concentration in waste source material and identify if an observable difference in upgradient and downgradient concentrations of contaminants are present to determine if contaminants at the Site are migrating to the Flathead River. The following sample locations have been selected (Figure 3):

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Worksheet 17 — Sampling Design and Rationale (Continued)

(UFP-QAPP Manual Section 3.1.1)
(EPA 2106-G-05 Section 2.3.1)

- Co-located surface water and surface waste source samples will be collected from the North Percolation Pond (east) and South Percolation Ponds at the following locations:
  - North Percolation Pond (east) to determine onsite contaminant concentrations present in the North Percolation Ponds (co-located surface water and sediment samples: CF-SW-13 and CF-WS-13). Sample location near the inflow point or depositional area of discharge from the Paste Plant Briquette Quench system, Paste Plant Ball Mill Bearing Cooling system, Wet Scrubber Blowdown, Air Compressor Cooling, Air Compressor Condensate Blowdown, Masonry Shop, and Battery Shop. Prior to 1978 the waste effluent from the soaking of the carbon cathodes was piped to the North Percolation Pond, also known as the Boiler Blowdown Pond (smaller pond).
  - Adjacent to Flathead River to determine onsite contaminants present in the South Percolations Ponds and determine if any upgradient contaminants are migrating downgradient near Flathead River (co-located surface water and sediment samples: CF-SW-14 and CF-WS-14 and CF-SW-15 and CF-WS-15). CF-SW-14 and CF-WS-14 are located at the inflow point of discharge from the Rectifier Oil Separator Sump, Sewage Treatment Plant, contact cooling water from direct chill casting of aluminum ingots, and Fabrication Shop Steam Cleaning Bay.

Groundwater

A full groundwater elevations sweep will be completed on a total of 25 onsite wells prior to sampling to aid in the determination of groundwater flow patterns at the Site (Figure 2). A total of 12 groundwater samples will be collected upgradient from the Site, adjacent to observed site features, and downgradient from the Site. These samples are meant to identify if an observable difference in upgradient and downgradient concentrations of contaminants are present to determine if contaminants at the Site are migrating to groundwater and offsite residential wells. The following sample locations have been selected (Figure 3):

- Upgradient of the site features to identify concentrations of contaminants in groundwater prior to the site features (CF-GW-MW-01).
- Downgradient of some site features and adjacent to the West Landfill to determine presence and contaminant migration (CF-GW-MW-02).
- Downgradient of some site features and adjacent to the Wet Scrubber Sludge Pond to determine presence and contaminant migration (CF-GW-MW-03).
- Downgradient of some site features and adjacent to the East Landfill (Spent Potliner Landfill) to determine presence and contaminant migration (CF-GW-MW-04).

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Worksheet 17 — Sampling Design and Rationale (Continued)

(UFP-QAPP Manual Section 3.1.1)
(EPA 2106-G-05 Section 2.3.1)

- Downgradient of some site features and adjacent to the North Percolation Pond (west) to determine presence and contaminant migration (CF-GW-MW-05).
- Downgradient of the site features and near the West Percolation Pond to determine if contaminants are migrating (CF-GW-MW-06).
- Downgradient of the site features to determine if contaminants are migrating (CF-GW-MW-07).
- Downgradient of the Site and adjacent to the Flathead River to determine if contaminants are migrating (CF-GW-MW-08).
- Downgradient of the Site and a residential well within Aluminum City to determine if contaminants are migrating offsite (CF-GW-MW-09 through CF-GW-MW-11).
- Upgradient of the Site to identify concentrations of contaminants in groundwater in residential wells prior to the Site (CF-GW-MW-12).

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Worksheet 18 — Sampling Locations and Methods

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)
(EPA 2106-G-05 Sections 2.3.1 and 2.3.2)

Sampling Location/ID	Matrix	Depth	Type	Analyte/Analytical Group	Sampling SOP Reference	Comments
CF-GW-MW-01	Groundwater	Unknown	MS/MSD	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-02	Groundwater	70-85 ft. bgs.	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GWFD-MW-02	Groundwater	70-85 ft. bgs.	Duplicate	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-03	Groundwater	72-87 ft. bgs.	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-04	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-05	Groundwater	45-60 ft. bgs.	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-06	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-07	Groundwater	100-111 ft. bgs.	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-08	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-09	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-10	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-11	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-GW-MW-12	Groundwater	Unknown	Discrete	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-01/ CF-SD-01	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-02/	Surface Water/	0-12 in./	Grab	VOCs, SVOCs, PAHs, TAL Metals,	See Worksheet 21	Collect samples for VOC analysis prior to

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Worksheet 18 — Sampling Locations and Methods (Continued)

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)
(EPA 2106-G-05 Sections 2.3.1 and 2.3.2)

Sampling Location/ID	Matrix	Depth	Type	Analyte/Analytical Group	Sampling SOP Reference	Comments
CF-SD-02	Sediment	0-6 in.		Fluoride, PCBs, Pesticides, B/N/A		collection of remaining analyses
CF-SW-03/ CF-SD-03	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-04/ CF-SD-04	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-05/ CF-SD-05	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-06/ CF-SD-06	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-07/ CF-SD-07	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SWFD-07/ CF-SDFD-07	Surface Water/ Sediment	0-12 in./ 0-6 in.	Duplicate	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-08/ CF-SD-08	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-09/ CF-SD-09	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-10/ CF-SD-10	Surface Water/ Sediment	0-12 in./ 0-6 in.	MS/MSD	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-11/ CF-SD-11	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-12/ CF-SD-12	Surface Water/ Sediment	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-13/ CF-WS-13	Surface Water/ Waste Source	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SWFD-13/ CF-WSFD-13	Surface Water/ Waste Source	0-12 in./ 0-6 in.	Duplicate	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses
CF-SW-14/ CF-WS-14	Surface Water/ Waste Source	0-12 in./ 0-6 in.	Grab	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses

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Worksheet 18 — Sampling Locations and Methods (Continued)

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)
(EPA 2106-G-05 Sections 2.3.1 and 2.3.2)

Sampling Location/ID	Matrix	Depth	Type	Analyte/Analytical Group	Sampling SOP Reference	Comments
CF-SW-15/ CF-WS-15	Surface Water/ Waste Source	0-12 in./ 0-6 in.	MS/MSD	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	See Worksheet 21	Collect samples for VOC analysis prior to collection of remaining analyses

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Worksheet 20 — Field Quality Control Sample Summary

(UFP-QAPP Manual Sections 3.1.1 and 3.1.2.)
(EPA 2106-G-05 Section 2.3.5)

Matrix	Analyte/Analytical Group	No. of Field Samples	No. of Field Duplicates	No. of MS/MSD	No. of Field Blanks	No. of Equipment Blanks[1]	No. of Trip Blanks	No. of Other	Total No. of Samples to Laboratory
Sediment	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	12 (including background)	1	1	1 per day	0	1 per day	0	TBD
Waste Source	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	3	1	1	1 per day	0	1 per day	0	TBD
Surface Water	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	15 (including background)	2	2	1 per day	0	1 per day	0	TBD
Groundwater	VOCs, SVOCs, PAHs, TAL Metals, Fluoride, PCBs, Pesticides, B/N/A	12 (including background)	1	1	1 per day	0	1 per day	0	TBD

[1] Disposable and/or dedicated equipment will be used for sample collection activities and therefore no equipment blanks are required.

Analytical quality control and corrective actions are described in QAPP Worksheet #28.

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Worksheet 21 — Field SOPs

(UFP-QAPP Manual Section 3.1.2)
(EPA 2106-G-05 Section 2.3.2)

Field SOPs to be used at the Site are located in the QAPP Appendix G and include the following:

SOP Number or Reference	Title, Revision, Date, and URL (if available)	Originating Organization	SOP Option or Equipment Type (if SOP provides different options)	Modified for Project? Y/N	Comments
2006	Sampling Equipment Decontamination, 6/2011	U.S. EPA, Environmental Response Team (ERT)		N	
2007	Groundwater Well Sampling, 6/2011	U.S. EPA, ERT		N	Existing dedicated sampling pumps in monitor wells
2012	Soil Sampling, 6/2011	U.S. EPA, ERT		N	
2013	Surface Water Sampling, 6/2011	U.S. EPA, ERT		N	
2016	Sediment Sampling, 6/2011	U.S. EPA, ERT		N	
2017	Waste Pile Sampling, 6/2011	U.S. EPA, ERT		N	
2043	Water Level Measurement, 6/2011	U.S. EPA, ERT	TBD	N	
2049[1]	IDW Management, 6/2011	U.S. EPA, ERT		N	
G-12	Specifications and Guidance for Contaminant-Free Sample Containers, 12/1992	U.S. EPA, Office of Solid Waste and Emergency Response		N	
2001	General Field Sampling Guidelines, 6/2011	U.S. EPA, ERT		N	

[1] Field SOP included as Appendix B.

Environmental samples will be collected for Routine Analytical Services (RAS) through the CLP. CLP-collected environmental samples will adhere to the procedures described in the *EPA Contract Laboratory Program Guidance for Field Samplers (January 2011)* (QAPP Appendix H).

Investigation Derived Waste

For purposes of this SAP, investigation-derived wastes (IDW) are defined as any byproduct of the field activities that is suspected or known to be contaminated with hazardous substances. The performance of field activities will produce waste products, including spent sampling supplies (disposable scoops), expendable PPE (nitrile gloves), and decontamination fluids.

Handling of IDW will be performed according with Standard Operating Procedure (SOP) 2049 as listed above as well as procedures described

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Worksheet 21 — Field SOPs (Continued)

(UFP-QAPP Manual Section 3.1.2)
(EPA 2106-G-05 Section 2.3.2)

in *Management of Investigation Derived Wastes during Site Inspections (May 1991)*(QAPP Appendix J). Spent sampling supplies and expendable PPE are not anticipated to be considered a hazardous and will be containerized and disposed of in the municipal waste system.

Decontamination Procedures

General decontamination procedures are described in EPA ERT SOP #2006 Sampling Equipment Decontamination.

Decontamination of sampling equipment must be conducted consistently to assure the quality of samples collected. All non-disposable sampling equipment that contacts potentially contaminated soil or water will be decontaminated. It is anticipated that START sample collection will exclusively use dedicated/disposable sampling tools and therefore, will not be decontaminated, but will be packaged for appropriate disposal. Materials to be stored more than a few hours will be covered.

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Worksheet 22 — Field Equipment Calibration, Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.1.2.4)
(EPA 2106-G-05 Section 2.3.6)

The following equipment calibration, maintenance, testing, and inspection procedures are applicable to the Site:

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Title or Position of Responsible Person	Verification	SOP Reference[1]
Horiba U-50/YSI® 600XLM Water Quality Meters	Calibrate probes with standards per instrument instruction manual	Check batteries, clean probes, store in manufacturer recommended solution	Calibration check	Visually inspect for external damage to probe(s)	Refer to instrument SOP	Refer to instrument SOP	Refer to instrument SOP	Field personnel	WAM/COR	G-13/G-14
Water Level Indicators	Calibrate tape against calibrated steel measuring tape	Clean prior and after each use, check battery	Calibration and operational equipment check	Visually inspect for obvious defects, broken parts, or cleanliness	Prior to use	Equipment operational	Repair/ replace as needed	Field personnel	WAM/COR	Instrument-Specific
Sampling Tools (Disposable Scoops)	NA	NA	NA	Visually inspect for obvious defects or broken parts	Prior to use	NA	Replace	Field personnel	WAM/COR	NA
GPS	NA	Check Battery	NA	Visually inspect for damage, ensure proper battery function, ensure receiver is able to obtain satellite reception	Prior to use	Proper battery function, satellite reception	Refer to instrument SOP	Field personnel	WAM/COR	NA

[1] Refer to Field SOPs (Worksheet 21) and Analytical SOPs (Worksheet 23).

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Worksheet 23 — Analytical SOPs

(UFP-QAPP Manual Section 3.2.1)
(EPA 2106-G-05 Section 2.3.4)

Laboratory analytical SOPs to be used on the Site include the following:

Lab SOP Number[1]	Title, Revision Date, and/or Number and URL (if available)	Screening or Definitive Data	Matrix/Analytical Group	SOP Option or Equipment Type	Modified for Project? (Y/N)
TBD	METHOD 8082A PCBs by gas chromatography (GC), 2/2007, http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/8082a.pdf	Definitive	Soil, sediment, debris, water, aquatic animal tissue/PCBs	GC	TBD
SOM01.2	U.S. EPA CLP Statement of Work for Organic Analysis, SOM01.1, 5/2005, http://www.epa.gov/superfund/programs/clp/download/som/som11a-c.pdf MODIFICATIONS UPDATING SOM01.1 TO SOM01.2, 4/2007, http://www.epa.gov/superfund/programs/clp/download/som/som11tosom12mods.pdf	Definitive	Soil, sediment, debris, water, aquatic animal tissue/VOCs, SVOCs, Pesticides, Aroclors	Analyte specific	N
ISM01.3	U.S. EPA CLP Statement of Work for Inorganic Analysis, ISM01.2, 1/2010, http://www.epa.gov/superfund/programs/clp/download/ism/ism12a-c.pdf MODIFICATIONS UPDATING ISM01.2 TO ISM01.3, http://www.epa.gov/superfund/programs/clp/download/ism/ism12toism13mods.pdf	Definitive	Soil, sediment, debris, water, aquatic animal tissue/Metals and cyanide	Analyte specific	N

[1] Lab SOP numbers are lab-specific.

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Worksheet 24 — Analytical Instrument Calibration

(UFP-QAPP Manual Section 3.2.2)
(EPA 2106-G-05 Section 2.3.6)

The responsibility for the calibration of laboratory equipment rests with the selected laboratories. Each type of instrumentation and each U.S. EPA-approved method have specific requirements for the calibration procedures, depending on the analytes of interest and the sample medium. The calibration procedures and frequencies of the equipment used to perform the analyses will be in accordance with requirements established by the U.S. EPA. The laboratory QA manager will be responsible for ensuring that the laboratory instrumentation is maintained in accordance with specifications. Individual laboratory SOPs will be followed for corrective actions and preventative maintenance frequencies. Laboratory quality control, calibration procedures, CA procedures, and instrument preventative maintenance will be included in the Final SAP once the laboratory has been selected for the Site.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Title/Position Responsible for CA	SOP Reference[1]
Cold Vapor Atomic Absorption	Replace disposables, flush lines, check lamp current and gas flow	Sensitivity check	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate
GC/ GC/MD	See 8081B, 8082A, SOM01.2	Initial calibration after instrument set up, then when daily 12-hour calibration verification criteria are not met	For all target compounds, initial r^2 >0.995; and calibration verification % difference <15%	Inspect system; correct problem; re-run calibration and affected samples	Lab Manager/ Analyst	SOM01.2, 8082A
GC/MS	See 8260C, 8270D, SOM01.2	Initial calibration after instrument set up, then when daily 12-hour calibration verification criteria are not met	For all target compounds, initial r^2 >0.995; and calibration verification % difference <15%	Inspect system; correct problem; re-run calibration and affected samples	Lab Manager/ Analyst	SOM01.2
ICP-Atomic Emission Spectrometry (AES)	Replace disposable, flush lines, and clean autosampler	Analytical standards	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate
ICP/ ICP-MS	See 6010C, 6020A, ISM01.3	Calibration and initial calibration verification after instrument set up, then daily; continuing calibration verification 10% or every 2 hours, whichever is more frequent	Calibration r^2 >0.995; initial and continuing calibration verification (CCV) within ± 20% of true values	Inspect system; correct problem; re-run calibration and affected samples	Lab Manager/ Analyst	ISM01.3

[1] Refer to the Analytical SOPs table (Worksheet 23).

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Worksheet 26 & 27 — Sample Handling, Custody, and Disposal

(UFP-QAPP Manual Section 3.3)
(EPA 2106-G-05 Manual Section 2.3.3)

Examples of field form (QAPP Appendix K), chain-of-custody (COC) (QAPP Appendix L), and sample label and custody seal (QAPP Appendix M) documentation are attached (Appendix D). SOPs for sample handling (identified in the table below) are located in QAPP Appendix G.

Sampling Organization: WESTON
Laboratory: CLP/TBD

Note –The WAM/DAO will review and approve the SAP prior to proceeding with lab procurement. Therefore this information will not be available until the lab procurement has been finalized.

Method of sample delivery (shipper/carrier): FedEx
Number of days from reporting until sample disposal: 160 days

Activity	Organization and Title or Position of Person Responsible for the Activity	SOP Reference
Sample Labeling	Field Personnel	SOP G-1 & G-3
COC Form Completion	Field Personnel	SOP G-8
Sample Packaging	Field Personnel	SOP G-9
Shipping Coordination	Field Personnel	SOP G-9
Sample Receipt, Inspection, & Log-in	Laboratory Sample Custodian	Laboratory SOP
Sample Custody and Storage	Laboratory Sample Custodian /Laboratory Analytical Personnel	Laboratory SOP
Sample Disposal	Field Personnel/Laboratory Sample Custodian /Laboratory Analytical Personnel	SOP G-1 & G-3/Laboratory SOP

Supplies and consumables can be received at a WESTON office, U.S. EPA Warehouse or at a site. When supplies are received at a WESTON office or U.S. EPA Warehouse, the PM or PTL will sort the supplies according to vendor, check packing slips against purchase orders, and inspect the condition of all supplies before the supplies are accepted for use on a project. If the supplies do not meet the acceptance criteria, deficiencies will be noted on the packing slip and purchase order. The item will then be returned to the vendor for replacement or repair.

Procedures for receiving supplies and consumables in the field are similar to those described above. Upon receipt, items will be inspected by the WESTON PM or PTL against the acceptance criteria. Any deficiencies or problems will be noted in the field logbook, and deficient items will be returned for immediate replacement.

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TABLES

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Table 2
SAP Revision Form

Site: Columbia Falls Aluminum Company
WAM: Robert Parker
TDD: 1305-04

Date	Revision Number	Proposed Change to SAP/QAPP	Reason for Change of Scope/Procedures	SAP Section Superseded	Requested By	Approved By

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Table 3
Sampling and Analysis Summary

Site: Columbia Falls Aluminum Company
WAM: Robert Parker
TDD: 1305-04

Matrix	Analytical Parameter	Analytical Method	Containers (Numbers, Size, and Type)	Preservation Requirements	Number of Sampling Locations	Number of Field Duplicates	Number of MS/ MSDs[2]	Number of Blanks (Trip, Field, Equip. Rinsate)[1]	Total Number of Samples to Lab[3]	Preparation Holding Time
Groundwater	VOCs	EPA SOM01.2	Three 40-mL glass vials with septum caps	HCL to pH < 2 and store @ < 4°C	12	1	1	1 trip blank, 1 field blank per day	TBD	Not Applicable (N/A)
	SVOCs/ PAHs	EPA SOM01.2	Two 1-Liter Amber glass bottles	Store @ < 4°C	12	1	1	1 field blank per day	TBD	7 days
	TAL Metals and Cyanide	EPA ISM01.3	One 1-Liter polyethylene bottles	HNO_3 to pH < 2 and store @ < 4°C	12	1	1	1 field blank per day	TBD	N/A
	Fluoride	EPA 300.0/ SM 3111D	One 8-oz glass jar	Store @ < 4°C	12	1	1	1 field blank per day	TBD	N/A
	Pesticides/ PCBs	EPA SOM01.2/ 8082A	Two 1-Liter Amber glass bottles	Store @ < 4°C	12	1	1	1 field blank per day	TBD	7 days
	Base/ Neutral/ Acids	EPA 625	One 8-oz glass jar	Store @ < 4°C	12	1	1	1 field blank per day	TBD	N/A

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Table 3
Sampling and Analysis Summary (Continued)

Matrix	Analytical Parameter	Analytical Method	Containers (Numbers, Size, and Type)	Preservation Requirements	Number of Sampling Locations	Number of Field Duplicates	Number of MS/ MSDs[2]	Number of Blanks (Trip, Field, Equip. Rinsate)[1]	Total Number of Samples to Lab[3]	Preparation Holding Time
Surface Water	VOCs	EPA SOM01.2	Three 40-mL glass vials with septum caps	HCL to pH < 2 and store @ < 4°C	15	2	2	1 trip blank, 1 field blank per day	TBD	N/A
	SVOCs/ PAHs	EPA SOM01.2	Two 1-Liter Amber glass bottles	Store @ < 4°C	15	2	2	1 field blank per day	TBD	7 days
	TAL Metals and Cyanide	EPA ISM01.3	One 1-Liter polyethylene bottles	HNO_3 to pH < 2 and store @ < 4°C	15	2	2	1 field blank per day	TBD	N/A
	Fluoride	EPA 300.0/ SM 3111D	One 8-oz glass jar	Store @ < 4°C	15	2	2	1 field blank per day	TBD	N/A
	Pesticides/ PCBs	EPA SOM01.2/ 8082A	Two 1-Liter Amber glass bottles	Store @ < 4°C	15	2	2	1 field blank per day	TBD	7 days
	Base/ Neutral/ Acids	EPA 625	One 8-oz glass jar	Store @ < 4°C	15	2	2	1 field blank per day	TBD	N/A
Sediment/ Waste Source	VOCs	EPA SOM01.2	One 2-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	N/A
	SVOCs/ PAHs	EPA SOM01.2	One 8-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	14 days

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Table 3
Sampling and Analysis Summary (Continued)

Matrix	Analytical Parameter	Analytical Method	Containers (Numbers, Size, and Type)	Preservation Requirements	Number of Sampling Locations	Number of Field Duplicates	Number of MS/ MSDs[2]	Number of Blanks (Trip, Field, Equip. Rinsate)[1]	Total Number of Samples to Lab[3]	Preparation Holding Time
	TAL Metals and Cyanide	EPA ISM01.3	One 8-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	N/A
Sediment/ Waste Source	Fluoride	EPA 300.0/ SM 3111D	One 8-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	N/A
	Pesticides/ PCBs	EPA SOM01.2/ 8082A	One 8-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	14 days
	Base/ Neutral/ Acids	EPA 625	One 8-oz glass jar	Store @ < 4°C	15	1	1	0	TBD	N/A

Notes:
[1] Trip blanks are only required for VOCs in water samples.
[2] For the samples designated for MS/MSDs, triple volume is required for VOCs and double volume for other water parameters.
[3] Total number of samples to the laboratory does not include MS/MSD samples.

°C – Degrees Celsius
Equip. – Equipment

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FIGURES

APPENDICES